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Immunization strategy for induction of local genital immunity in the minipig model of human genital *Chlamydia* infection

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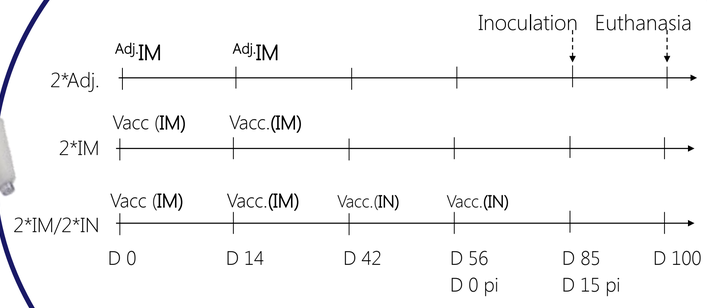
Introduction

International efforts in developing a vaccine against *Chlamydia trachomatis* have highlighted the need of novel immunization strategies for the induction of genital immunity.

In this study, we used a promising minipig model with a reproductive cycle and genital tract very similar to humans, to evaluate immunization strategies, with intramuscular priming and intranasal boosting.

We used a multi-subunit vaccine consisting of *C. trachomatis* antigens capable of inducing neutralizing antibodies and a broad T cell response, formulated with the Th1/Th17 promoting adjuvant CAF01.

Immunizations



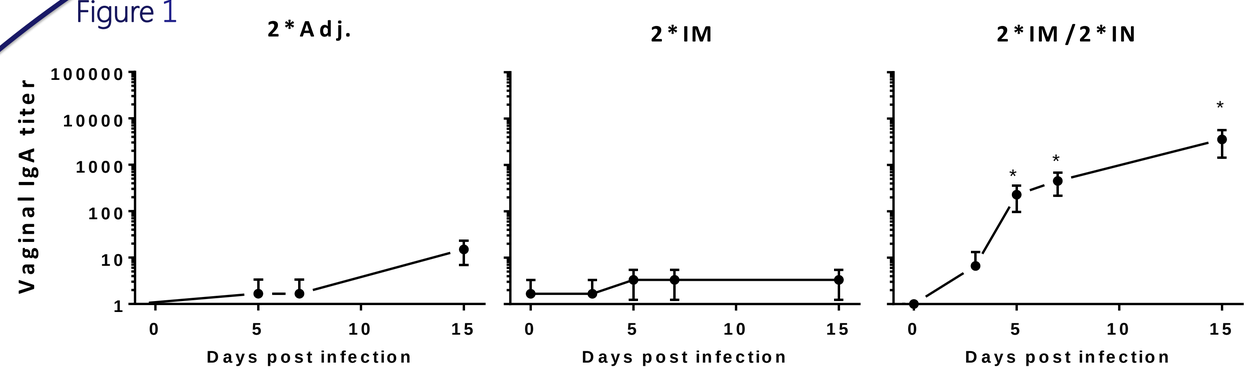
Ag=antigen, Adj.=adjuvant, D=day, IM=Intramuscular, IN=Intranasal pi=post infection

Methods

Animals: 18 female sexually mature Göttingen Minipigs (3 groups with 6 pigs in each).
Vaccine: Recombinant subunit fusion proteins (Hirep1 and CTH93) with fragments of the VD4 region of MOMP capable of inducing neutralizing antibodies and a broad T cell response formulated with the Th1/Th17 adjuvant CAF01.
Vaccinations: Intramuscular (IM) and intranasal (IN), (see the immunization schedule).
Samples: Blood samples, nasal swabs and vaginal swabs.
Analyses: ELISA with vaccine antigens, detecting IgG, IgA and secretory component (SC). Restimulation of PBMCs and evaluation of the IFN-ɣ and IL-17 content in the supernatant. All immune responses are shown against the vaccine antigen Hirep1.

Results

Figure 1



Following genital challenge infection an accelerated and highly significant genital IgA response was mounted from day 5 pi in the IN boosted group (Fig. 1), which correlated with accelerated bacterial clearance on day 3 pi in the IN boosted (Fig. 2).

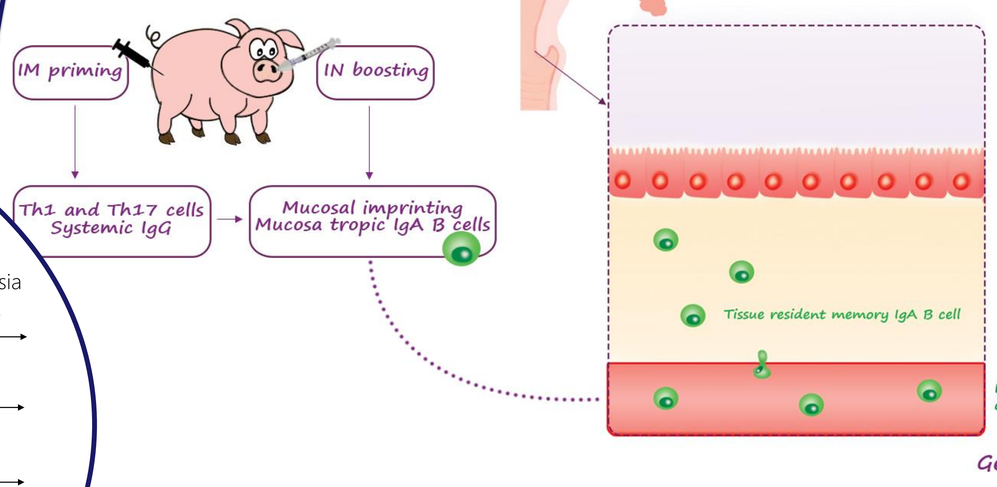
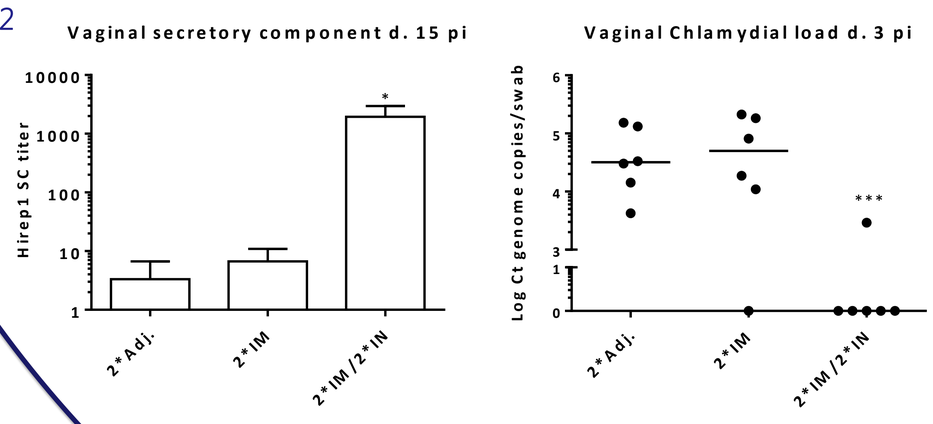
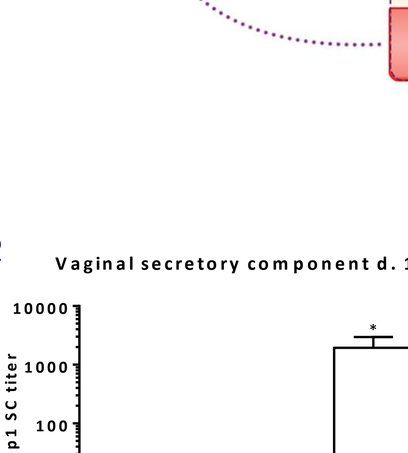
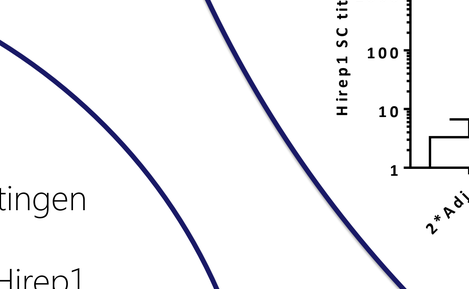


Figure 2



The genital significant IgA was confirmed to be locally produced by detecting correlated significant levels of antigen specific secretory component (SC) on the vaginal mucosa (Fig. 2). The enhanced clearance of *C. trachomatis* on day 3 pi in the IN boosted group was significantly ($p<0.0001$) inversely correlated with the level of antigen-specific vaginal secretory component on day 15 pi.





Conclusions

We demonstrate that an immunization strategy with IM priming and IN boosting, results in an accelerated and highly significant secretory IgA response in the genital tract of female minipigs following genital challenge. The genital IgA response was correlated with enhanced clearance of *C. trachomatis* infection, suggesting that IgA in the minipig model is involved in protection against *C. trachomatis.*

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